Regional coal resources

Find out more about New Zealand's regional coal resources.

Northland

Coal has been mined from four deposits at Kawakawa, Hikurangi, Kiripaka and Kamo with a total production of about 7.5 million tonnes. Most known areas of coal have been worked out. The last operating mine was the underground mine at Kamo, which closed in 1955.

Northland coals are sub-bituminous A to high volatile bituminous C in rank. A single coal seam up to 8 m thick is locally present in Late Eocene Kamo Coal Measures.

Waikato

Coalfields extend for 160 km between Drury (30 km south of Auckland) to Mangapehi (20 km south of Te Kuiti). The main coalfields are Maramarua, Waikare, Huntly and Rotowaro in the north of the region, and Kawhia and Tihiroa in the south.

All Waikato are of sub-bituminous rank, from sub-bituminous C in the Tihiroa, Kawhia, Waikare and Maramarua fields, to sub-bituminous A at Rotowaro and Huntly. Coals in the north of the region have ash contents of 3-6% and sulphur contents of generally about 0.3%. Seams in the south have higher ash contents than in the north, averaging about 10% in Kawhia and Tihiroa, and much higher than in the north, reaching 8.7% in parts of Kawhia Coalfield.

Coal seams are within the Eocene Waikato Coal Measures. The Kupakupa seam is the most commonly mined, although it is restricted to the northern part of the region. The Kupakupa seam is typically 3-10 m thick, but reaches 20 m in parts of Huntly and Waikare coalfields. Underlying Taupiri seams and an overlying Renown Seam are mined at Rotowaro. Several other seams are less widely distributed, thinner, and commonly more split. Some have been mined.

Coal has been mined in the Waikato since the late 1840s and about 95 million tonnes have been produced. About 850,000 tonnes of coal a year is currently produced from opencast mines at Rotowaro and Maramarua. Most is used by NZ Steel’s plant at Glenbrook and for process heat in the Waikato dairy industry. A declining amount is used by the Huntly power station.

Coal-in-ground resources for the region are about 2 billion tonnes, but a large proportion of this is too deep to mine. The Huntly East mine, which was the last remaining underground mine in the North Island, closed in 2015. The remaining opencast resources that have reasonable prospects for eventual economic extraction are limited.

Taranaki region
Coalfields in north-eastern Taranaki lie between Taumarunui and Mokau on the West Coast of the North Island. Coal has been mined on a small scale since the 1880s, with a total production of about 3.7 Mt from several mines. There has been no production since the last mine, in the Waitewhena coalfield, closed in 1990. Coal-in-ground resources for the region are 380 Mt, mostly in the Mokau coalfield. The remote location of the coalfields is a constraint on further development.

Coal seams are within the Miocene Maryville Coal Measures within the predominantly marine Mokau Group. This depositional setting has led to the development of typically thin seams extending over large areas with little variation in thickness. There are at least 11 seams up to 3 m thick, with up to five seams present in the Mokau coalfield. The coal measures are only gently tilted, with minor faulting. Taranaki coals are of sub-bituminous A to B rank. Ash contents are commonly 2-12% and sulphur contents are generally between 1 and 4% but reach 5.7% in places.

West Coast

Several coalfields sit within an area of about 3000 km² of the rugged ranges of the South Island's West Coast (Fig. WC1), roughly between Greymouth, Reefton and Sedonville (40 km northeast of Westport). The main coalfields are Buller, Greymouth, Pike River, Inangahua, Reefton and Garvey Creek.

Coal mining began on the West Coast in 1864, and numerous mines have produced a total of about 125 Mt. Production for 2015 was 1.58 million tonnes, down from a peak of around 2.5 million tonnes because of depressed coking coal prices. The Solid Energy mine complex at Stockton in the Buller coalfield is the largest coal mine in New Zealand.

West Coast coals straddle almost the full range of coal rank. Most are bituminous, from High Volatile C to Low Volatile. A small deposit at Fox River reaches anthracite rank and some other deposits are sub-bituminous, just touching lignite rank in one coalfield.

Coal seams occur mainly within two main sets of coal measures: Late Cretaceous to earliest Tertiary Paparoa Coal Measures, and Eocene Brunner Coal Measures. The Rotokohu Coal Measures of Miocene age also contain productive seams.

Paparoa Coal Measures are up to 800 m thick and contain seams up to 21 m thick characterised by marked lenticularity. Brunner Coal Measures vary in thickness from a few metres to 130 m, and are overlain by marine strata. Seams tend to be of limited extent, but are up to 20 m thick in places. The complex tectonic history of the West Coast has resulted in great structural complexity in places. All of New Zealand's bituminous coal production is from the West Coast, mainly for export as coking coal, with some specialist coal. Some West Coast coals have high fluidity and swelling characteristics with low ash contents, and are exported as blending coals. Easily accessible hard coking coal is becoming scarce in West Coast coalfields, and blending from different mines is critical to maintaining export specifications.

Coal-in-ground resources for the region are about 500 million tonnes, but the most easily won coal has been extracted and what remains is increasingly costly to mine. Coking coals are in the Greymouth (mostly underground) and Buller (mostly opencast) coalfields. The smaller Inangahua, Reefton and Garvey Creek coalfields are important producers for local markets.

Canterbury region
Several small coal deposits lie in the foothills of the Southern Alps west of Christchurch. Many small mines have operated since 1866, producing a total of about 2 Mt. One mine at Malvern Hills produces about 40,000 tonnes a year for local industrial use, mainly by dairy factories.

Canterbury coals are lignite A to sub-bituminous C in rank, reaching anthracite rank in places through contact metamorphism. Ash and sulphur contents vary. Most coal seams are Late Cretaceous to Eocene in age.

**Otago region**

Otago coal deposits occur in two different geological settings. Coal deposits near the east Otago coast north and south of Dunedin are within coal measures of Late Cretaceous to Paleocene age. Kaitangata coalfield is the largest, covering a large unworked lignite deposit in the west and a multi-seam deposit in the east. Coals in the east are of lignite to sub-bituminous B rank with typically 4-11% ash and sulphur contents of 1.5-4.5%. Extensive underground mines have worked this area in the past, and significant opencastable coal remains. A mine at Kaitangata coalfield produces coal of sub-bituminous C rank for local use.

In Central Otago there are large lignite deposits at Home Hills, Hawkdon and Roxburgh. Almost all of the Central Otago lignites are in Miocene fluviatile and lacustrine sediments preserved in fault angle depressions. The Central Otago lignites are structurally simple except at their faulted margins, generally in a single seam with multiple splits totalling 20-90 m thickness. The lignites typically have in-ground moisture contents of 40-50% with 3-15% ash and less than 0.5% sulphur. A small mine works near Roxburgh.

**Southland**

Coal has been mined from Ohai coalfield, 70 km northwest of Invercargill, since 1879. To the east, extensive lignite deposits underlying the Eastern Southland plains. The combined production of 650,000 tonnes from Ohai Coalfield and a lignite mine near Mataura is used mainly by the Southland dairy industry.

Ohai coalfield occupies a fault-controlled depression containing Morley Coal Measures in the Late Cretaceous Nightcaps Group and Beaumont Coal Measures within the Eocene Nightcaps Group. Morley seams up to 23 m thick are the most economically important. The stratigraphy and structure of the coalfield is complex. Morley coal at Ohai ranges from sub-bituminous A to high volatile bituminous C in rank with ash contents typically about 3% with and 0.2% sulphur. Ohai coalfield has been explored for coal seam gas, revealing deep in-ground resources of 700 million tonnes, but these do not have reasonable prospects for eventual economic extraction.

The Eastern Southland lignite seams are within the Late Oligocene to Early Miocene Gore Lignite Measures, fluvio-deltaic deposits at least 500 m thick and overlain by Pleistocene to Holocene gravels. The main lignite-bearing unit is 50-300 m thick and contains multiple-laterally persistent seams up to 18 m thick. Seams are generally only slightly deformed. Southland lignites typically have in-ground moisture contents of 40-65% with 3-20% ash and generally less than 0.6% sulphur contents.

**South Island lignite resources**
Lignite deposits in Otago and Southland contain more than 9 billion tonnes in 10 major deposits. This is a very large, nationally significant resource which has the potential to be used as a feedstock for a petrochemical industry, using gasification technology to convert lignite to fertiliser, transport fuels or other high value energy products.

If extracted at a rate of 20 million tonnes per year, the lignite resource could provide energy and feedstock for most of New Zealand’s transport fuel and petrochemical requirements for over 300 years. Mining studies in the 1980s estimated total energy content of mineable lignite at about 75,000 PJ. This is equivalent to about 20 times the energy content of the Maui gas field.

Last updated: 19 January 2017

© 2017 New Zealand Petroleum & Minerals